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**Bumpus, on 'The Elimination of the Unfit.'**<sup>1</sup>—Professor Bumpus has availed himself of the opportunity to contribute to the establishment of the hypothesis of natural selection by the use of material furnished to his hands by the great storm of Feb. 1, 1898, at Providence, R. I., in the form of 136 House Sparrows which, as victims of the storm, were brought to the Anatomical Laboratory of Brown University. Of these 72 revived and 64 perished. A careful study of these birds by means of detailed measurement, as of length, alar extent, the length of head, humerus, femur, tibio-tarsus, etc., revealed the fact that in the birds that died a larger proportion departed from the average or normal standard in one or more ways than was the case among those that survived. Hence Prof. Bumpus concludes: (1) . . . that the birds which perished, perished not through accident, but because they did not possess certain structural characters which would have enabled them to withstand the severity of the test imposed by nature; they were eliminated because they were unfit. (2) The process of relative elimination is most severe with extremely variable individuals, no matter in what direction the variations may occur. It is quite as dangerous to be conspicuously above a certain standard of organic excellence as it is to be conspicuously below the standard. It is the *type* that nature favors. (3) Disregard of structural qualifications finally produces a throng of degenerates, whose destruction will follow the arrival of adversity." The data on which the conclusions rest are presented in detail, mostly in the form of tabulated measurements.—J. A. A.

**Whitman on 'Animal Behavior.'**<sup>2</sup>—In his very suggestive paper on 'Animal Behavior' Professor Whitman has made a most valuable contribution to the subject of Instinct and its relation to Intelligence. It is the outcome of elaborate and most careful study of the 'behavior of animals,' both of low and of high organization, as the leeches of the genus *Clepsine*, of the large fresh water salamander of the genus *Necturus*, and various species of Pigeons. The behavior of these different animals under varying conditions is detailed at length, and its meaning and bearing on the origin and relations of instinct and intelligence are most lucidly discussed, in connection with the leading hypotheses on the subject.

Not long since it was a more or less generally accepted theory that instincts were simply inherited habits. Recently, as Prof. Whitman notes, this theory has been abandoned as inadequate by some of its

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<sup>1</sup>The Elimination of the Unfit as illustrated by the Introduced Sparrow, *Passer domesticus*. A Fourth Contribution to the Study of Variation. By Hermon C. Bumpus, Biological Lectures delivered at the Marine Biological Laboratory of Wood's Holl. Session of 1897 and 1898 (1899) pp. 209-226.

<sup>2</sup>Animal Behavior. By C. O. Whitman. Biological Lectures of the Marine Biological Laboratory, Wood's Holl, Mass., 1898 (1899), pp. 285-338.

former chief advocates, who have come to adopt the view that instinct is a product of evolution. We have not space to go over the evidence at length, but would commend to those interested Prof. Whitman's able exposition of the subject. From his summary of the subject, we quote somewhat at length. Under the heading 'A Few General Statements' (pp. 328-331), he says:

"1. Instinct and structure are to be studied from the common standpoint of phyletic descent. . . . Instincts are evolved rather than involved (stereotyped by repetition and transmission), and the key to their genetic history is to be sought in their more general rather than in their later and incidental uses.

"2. The primary roots of instincts reach back to the constitutional properties of protoplasm, and their evolution runs, in general, parallel with organogeny. As the genesis of organs takes its departure from the elementary structure of protoplasm, so does the genesis of instincts proceed from the fundamental functions of protoplasm. Primordial organs and instincts are alike few in number and generally persistent. . . .

"3. Remembering that structural bases are relatively few and permanent as compared with external morphological characters, we can readily understand why, for example, five hundred different species of wild pigeons should all have a few common undifferentiated instincts, such as drinking without raising the head, the cock's time of incubating from about 10 A.M. to about 4 P.M., etc. . . .

"5. Instinct precedes intelligence both in ontogeny and phylogeny, and it has furnished all the structural foundations employed by intelligence. In social development also instinct predominates in the earlier, intelligence in the later stages.

"6. Since instinct supplied at least the earlier rudiments of brain and nerve, since instinct and mind work with the same mechanisms and in the same channels, and since instinctive action is *gradually* superceded by intelligent action, we are compelled to regard instinct as the actual germ of mind.

"7. The automatism, into which habit and intelligence may lapse, seems explicable, in a general way, as due more to the preorganization of instinct than to mechanical repetition. . . . Habits appear as the uses of instinct organization which have been learned by experience. . . .

"9. We are apt to contrast the extremes of instinct and intelligence — to emphasize the blindness and inflexibility of the one with the consciousness of the other. It is like contrasting the extremes of light and dark and forgetting all the transitional degrees of twilight. . . . Instinct is blind, so is the highest human wisdom blind. The distinction is one of degree. . . ."

Prof. Whitman's experiments with various species of Pigeons, which he has made the subject of special investigation in this connection, are of the highest interest and we regret lack of space prevents our summarizing them in the present review. — J. A. A.